

### **REMARKS**

Claims 26-43, 46-55, and 97-100 are pending in the application, with independent claims 26 and 46 being currently amended. In addition, claims 1-25, 44, 45, and 56-96 are cancelled without prejudice with Applicants reserving the right to pursue such claims in a divisional application.

In this Official Action, Examiner rejects all pending claims under 35 U.S.C. §103(a) as being obvious over the combination of U.S. Patent No. 6,416,869 (“the ‘869 patent”) and Shimakura U.S. Patent No. 6,475,300 (“Shimakura”), as well as over the combination of WO 00/63462 (“the ‘462 application”) and Shimakura and further in combination with both Song U.S. Patent No. 6,361,592 (“Song”) and Brown U.S. Patent No. 6,132,808 (“Brown”).

Applicants have amended independent claims 26 and 46, which are the only independent claims, to more clearly define Applicants’ methods of bonding rubber to a metal substrate over the art of record. More specifically, independent claim 26 now recites, in part, drying the silane solution on the metal substrate to form a coating having a thickness in the range from about 0.1  $\mu\text{m}$  to less than 1  $\mu\text{m}$  [underlining for emphasis]. Independent claim 46 has been similarly amended and now recites, in part, applying the solution to at least a portion of a surface of the metal substrate in an amount sufficient to form a coating to a thickness in the range from about 0.1  $\mu\text{m}$  to less than 1  $\mu\text{m}$  [underlining for emphasis]. Support for the amendments to these claims can be found throughout the specification and, more specifically, at least at paragraphs 0014 and 0016, for example.

With respect to the obviousness rejections, Examiner recognizes that there is no

teaching in the '462 application or the '869 patent of drying the silane solution on a metal substrate to form a coating having a thickness in the range from about 0.1  $\mu\text{m}$  to about 1  $\mu\text{m}$  thereon (or from about 0.2  $\mu\text{m}$  to about 0.6  $\mu\text{m}$ ). However, to support a non-obviousness rejection, Examiner relies on Shimakura to fill the teaching void of these references. More specifically, Examiner takes the position that Shimakura demonstrates that the coating thickness of an analogous silane solution (i.e., a primer solution), which is applied onto a metal substrate to bond a topcoat, is a result-effective variable, i.e. a variable which achieves a recognized result. In support thereof, Shimakura is asserted to disclose that corrosion resistance is insufficient if the coating thickness is too thin and adhesion properties may be compromised if too thick. *See* col. 6, lines 5-9. To that end, Examiner states that it would have been obvious to one of ordinary skill in the art to provide an optimized coating thickness in the process of the '462 application or the '869 patent because the teachings of Shimakura demonstrate that the primer thickness is a result-effective variable, ensuring sufficient corrosion resistance and adhesion properties. *See, e.g., In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); and the Official Action, pages 4-5, 10, 13-15. Applicants respectfully disagree and submit that all of the rejections are in error and, in any event, overcome by the claims as presently amended.

Upon close review of Shimakura, this reference is completely devoid of any discussion of bonding rubber to metal. Rather, Shimakura concerns itself with bonding top coats, i.e. paint (NOT rubber), to metal substrates via a primer coating. The optional top coating, such as a polyester top coating, i.e. a non-rubber, may be applied to the primer, which is a silane

solution, so as to bond to the metal substrate. The coating amount of the primer that is applied to the metallic surface is preferably equivalent to a dry thickness of 1 to 20  $\mu\text{m}$ . However, “if the dry thickness is less than 1  $\mu\text{m}$ , corrosion resistance will be insufficient.” [underlining for emphasis]. See, e.g., abstract; col. 2, lines 46-67; col. 5, lines 51-58; col. 6, lines 5-14 and 39-46, and the Examples.

Examiner can appreciate that the mere fact that references can be combined does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). There is clearly no such suggestion of the desirability of the combination for the reasons that follow.

In the instant situation, Applicants' method specifically requires bonding rubber to metal. Again, Shimakura discloses only the bonding of non-rubbers (e.g., paints) to metal substrates, not rubber to metal. Since Shimakura teaches non-rubber to metal bonding, what motivation or suggestion is there to combine the teachings of this reference with the rubber bonding of the '462 application or the '869 patent to provide Applicants' claimed methods of bonding rubber to metal? There is none. In further support thereof, due to the differences between rubbers and non-rubbers and the unpredictability involved with silane chemistry (let alone chemistry in general), particularly when attempting to bond rubber to metal substrates, there can be no motivation to look to the non-rubber bonding teachings of Shimakura to provide an optimized coating thickness in the rubber to bonding processes of the '462 application or the '869 patent. Accordingly, the rejections of the claims as obvious are in error and should be withdrawn.

And, even assuming *arguendo* that one skilled in the art would have been motivated to use the teachings of Shimakura and optimize the silane coating thickness in the process of the '462 application or the '869 patent, the combination still fails to teach or suggest a coating having a thickness in the range from about 0.1  $\mu\text{m}$  to less than 1  $\mu\text{m}$ , as required by Applicants' claims. To establish *prima facie* obviousness of a claimed invention, it is certainly well established that all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). In addition, a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). To that end, Examiner can appreciate that a *prima facie* case of obviousness cannot stand if a reference relied upon, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997).

In this instance, Shimakura clearly and specifically teaches away from a coating thickness that is less than 1  $\mu\text{m}$  and, thus, clearly teaches away from Applicants' claimed coating thickness of from about 0.1  $\mu\text{m}$  to less than 1  $\mu\text{m}$ . Notably, Shimakura states that "if the dry thickness of the silane-based primer layer is less than 1  $\mu\text{m}$ , corrosion resistance will be insufficient." See col. 6, lines 5-9. Accordingly, in addition to the failure to teach or suggest bonding rubber to metal, there can be no denying that Shimakura clearly and specifically teaches avoidance of silane coatings that are less than 1  $\mu\text{m}$ . Hence, it is respectfully submitted that the combination of the '462 application or the '869 patent and Shimakura fails to render obvious

Applicants' independent claims 26 and 46, nor any of the dependent claims.

Finally, since Shimakura fails to provide the requisite teachings to maintain Examiner's 103 obviousness rejections, the additional rejections based further on the combination of Song and Brown must also fall. Regardless, Applicants submit that neither Song nor Brown disclose a silane solution that includes an amino containing silane and a sulfur containing silane, as required by Applicants' method. Accordingly, without the inclusion of a sulfur containing silane in Song and Bond, such sulfur containing silane assisting in the bonding of rubber to the metal substrate, there can be no motivation for the combination.

In view of the foregoing, it is respectfully submitted that the rejections of the claims as obvious is in error and should be withdrawn.

### **Conclusion**

As a result of the remarks given herein, Applicants submit that the rejections of the pending claims have been overcome. Therefore, Applicant respectfully submits that this case is in condition for allowance and requests allowance of the pending claims.

If this Response leaves any issues open or Examiner wishes to discuss any further issues, a call to undersigned counsel would be gratefully appreciated. Applicants also have submitted all fees believed to be necessary herewith. Should any additional fees or surcharges be deemed necessary, Examiner has authorization to charge fees or credit any overpayment to Deposit Account No. 23-3000.

Respectfully submitted,  
WOOD, HERRON & EVANS, L.L.P.

By /Randall S. Jackson, Jr./  
Randall S. Jackson, Jr.  
Reg. 48,248

2700 Carew Tower  
Cincinnati, Ohio 45202  
(513) 241-2324  
FAX (513) 241-6234